THE SURGICAL TREATMENT OF GOITRE.

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The relatively infrequent occurrence of thyroid tumors in most parts of this country accounts in part, no doubt, for the tardy acceptance of operative treatment. A few sudden deaths from fulminating appendicitis or ruptured extra-uterine pregnancy soon convince the profession and the public of any community of the necessity for prompt and radical treatment. On the other hand, the slow growth of a goitre, the gradual development of alarming symptoms, and the small number of cases seen, have made all concerned ready to temporize with useless or even dangerous palliative measures, in spite of the fact that the ultimate outcome in many of these cases is certainly fatal and in almost as large a proportion of cases as with the more acute abdominal diseases just mentioned. In Switzerland, where goitre is a common disease, partial excision of the thyroid gland is as common as appendectomy is in the United States and is more free from danger. Kocher of Bern[1] reported 2160 excisions, with but three deaths in his second series of 1100 cases. Since 1902 the number of operations has increased so rapidly that he has since reported 3000 excisions. At the German Surgical Association last spring he reported that one of his assistants had operated upon 661 patients with but one death.[2] Probably no surgeon has had as great experience as Kocher, but in almost any Swiss clinic the operation for goitre is a daily occurrence, the results are highly satisfactory, and in practically all Europe the surgical treatment of goitre has been for many years a well-established procedure. As compared with statistics of European countries, the number treated in any American clinic is ridiculously small. Indeed, many American surgeons have never done a thyroid excision and apparently many, even among our most progressive practitioners, have never heard of surgical treatment for goitre, or if they have, do not consider it safe to advise for their patients. Although goitre is much less frequent in this country than in certain parts of Europe, there seems to be no reason why we should not offer our patients as satisfactory surgical relief from this distressing condition as is given in other civilized lands. Before discussing this question further it may be worth while briefly to consider the varieties of goitre and a few facts regarding the causes, symptoms, and diagnosis.

Thus far I have used the term goitre in the sense generally employed, meaning any enlargement of the thyroid gland, but these thyroid tumors may be divided into several distinct groups, with widely differing symptoms. Any extended discussion of the histology or pathology of thyroid lesions seems out of place: interest lies mainly along the lines of diagnosis and treatment. Enlargement of the thyroid may result from inflammation, hypertrophy, or tumors. The acute and chronic inflammations of the thyroid are of infrequent occurrence, and the symptoms of inflammation are generally readily recognized. The most important tumors are the various forms of adenoma, carcinoma, sarcoma, and cyst.

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[1] Chirurgische Operationslehre, Jena, 1902, fourth edition, p. 205.

[2] Annals of Surgery, 1906, vol. xlv, p. 758.

Simple and exophthalmic goitre are examples of the hypertrophies. The differences in microscopic structure of these hypertrophies have practical significance, hence, I mention that in simple goitre the enlargement is seen, by microscopic examination, to be caused chiefly by dilatation of the acini with colloid material; in exophthalmic goitre, on the contrary, the colloid material is lessened or even disappears, while there is a process of folding of the wall of the acini, giving increase in size of the gland and a larger surface of epithelial lining. Thus in exophthalmic goitre there is a very greatly increased area of secreting surface; the excess of thyroid secretion giving grave general symptoms. In simple goitre there is slight if any increase in secreting surface and pressure of the contained colloid material may even reduce secretion.

These various forms of thyroid enlargement cause various symptoms, but from whatever cause pressure symptoms are marked from the growth of a tumor of this important organ. Pathological examination is the true basis for classification of these as for other tumors, but we have to deal with three groups clinically: First, the group of tumors in which the symptoms, if any are present, are dependent solely on the enlargement of the gland and pressure on surrounding organs. Simple goitre, adenoma without metastasis, and simple cyst, while differing radically pathologically, all usually produce their symptoms in this way, by pressure only. In the second group we may place the malignant tumors, whether carcinoma, sarcoma, or adenoma with metastasis; these give the signs and symptoms of malignancy, in addition to the pressure symptoms. A third and most important clinical group is that accompanied by pronounced general symptoms, the exophthalmic goitre, usually called Graves' disease by English writers, and Basedow'sche Krankheit, by the Germans. In these cases the enlargement of the thyroid is accompanied by pronounced nervous symptoms, especially tremor, by protrusion of the eyeball, rapid heart beat and other vascular changes. It is important to note that nervous and vascular changes may exist without exophthalmos, or at first nervous symptoms alone may be present or vascular symptoms alone.

As little is known of the causes of goitre as of tumors in general. It is well known that they occur much more frequently in mountainous regions and are especially prevalent in Switzerland and the surrounding mountainous portions of Europe. I am told b medical missionaries from the mountainous districts of Asia that goitres are extremely prevalent there also and frequently attain enormous size. Goitre patients at Johns Hopkins Hospital usually come from the mountainous districts of Maryland, West Virginia, and Pennsylvania. Exophthalmic goitre frequently follows great nervous strain and has been supposed by some to be a purely nervous affection. Others incline to believe that the nervous symptoms are secondary to the diseased condition of the thyroid. A few observers attribute the disease to toxemia of intestinal origin. The inhabitants of no special country and no race are wholly exempt. It certainly occurs with greatest frequency in young adult females, and pregnancy and child birth apparently have some influence. A great deal has been written on the etiology of goitre, but so few positive facts are known that extended discussion at this time seems unjustified.

SYMPTOMS. With the benign and malignant tumors of the thyroid and simple goitre, symptoms are frequently entirely absent, with the exception of enlargement of the gland. In simple goitre the gradual enlargement of the thyroid may be associated, in the early months and years, with slight nervous symptoms, even palpitation and tremor. For this reason the early stage of a simple goitre may be mistaken for Graves' disease, but in these cases exophthalmos is said to be always absent. When exophthalmic goitre has existed for some time the bulging of the eyes, tremor, palpitation, and extreme nervousness, associated with enlargement of the thyroid form a striking clinical picture. Most of us are familiar with the eye symptom pointed out by von Graefe: the upper eyelid fails to follow the eyeball on looking down; and Stelwag's symptom, the apparent widening of the palpebral slit. When enlargement of the gland becomes great, difficulty in breathing and swallowing, change in the voice, cough, and sometimes even bloody expectoration are noticed. These symptoms, associated with a large goitre, are much less likely to be dangerous than when the enlargement is comparatively small, for then infiltrating carcinoma should be suspected.

Early diagnosis of enlargements of the thyroid is a matter of great importance. Kocher, Bloodgood, and others, have emphasized the fact that it is impossible to tell whether a tumor of the thyroid is malignant or not in the early stages of the disease, and unless a malignant growth of the thyroid is removed very early the condition becomes inoperable. At the Johns Hopkins Hospital the proportion observed has been 10 malignant tumors to 52 benign tumors; almost 20 per cent. and so large a proportion that the danger of temporizing with any thyroid tumor is easily seen.

TREATMENT. The question of treatment is one of great interest and of the greatest importance to our patients. Osler[3] declares that medicinal measures are notoriously uncertain, and the multitude of methods which have been suggested for exophthalmic goitre gives sufficient evidence of failure. One observer insists on the importance of directing treatment to the circulatory organs or perhaps the heart alone; another to the sympathetic nervous system, or some part of the general nervous system; another to the intestinal tract; another to the thyroid gland itself; one uses strong, another weak electric currents. Recently organotherapy has attracted much attention. Serum has been prepared from dogs and calves whose thyroids were previously removed; the milk of thyroidectomized she-goats has been employed under the name rodagen; the blood of patients suffering from myxedema has been injected; guinea-pigs, rabbits, roosters, and geese have been experimented with and more or less enthusiastic reports of results obtained have been given. Perhaps the most promising of the serums is that prepared by Beebe[4] from the thyroid of two persons who died from exophthalmic goitre. Rogers[5] and others have obtained promising results from the use of this serum, although very alarming symptoms were produced in some cases and no improvement in several. In his latest report Rogers gives four deaths in 54 cases treated by serum. Rhein[6] after reviewing numerous forms of organotherapy, expresses doubt whether the results are more encouraging than those obtained by the usual well-recognized therapeutic measures. It would seem that in spite of all efforts patients still remain uncured and experimenters are still looking for something new as a specific for exophthalmic goitre. While the internists have been treating almost every organ in the body, from the intestinal tract to the thyroid itself, with all kinds of drugs, serums, and extracts, made from animals and men, dead and alive, applied locally and taken internally, a few surgeons have been excising a part of the thyroid with most brilliant results in case of simple goitres and benign tumors, and although the mortality has been higher in exophthalmic goitre, the results have, on the whole, been better than in those treated medically, particularly when the unfavorable condition of the patient operated upon is considered. Recovery is very rapid after operation in these cases. There is little or no postoperative discomfort; usually immediate slowing of the pulse and relief of nervous symptoms. All of my patients have sat up in bed on the third day after the operation and have been out in a wheel chair on the fifth day. The scar left is practically invisible and is so low down that it is covered by the collar. Ten patients have come to me for operation within six months, and the extreme gratitude of these and all previously under my care, for their relief from their sufferings, has been such as I have never seen in the results of any other operation.

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[3] Practice of Medicine.

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[4] Jour. Amer. Med. Assoc., 1906, xlvii, 661.

[5] Ibid., 665.

[6] Amer. Med., 1906, xii, 164.

It is true that these operations involve several special dangers and difficulties: when greatly enlarged the thyroid gland is always in direct contact with the great vessels and nerves of the neck for some distance; frequently the great vessels are considerably displaced from their normal relations; in 3 out of 10 of my own cases the growth extended down into the thoracic cavity behind the clavicle and sternum in close relation to the apex of the pleural cavity; in all cases the thyroid gland is friable and the vessels are thin walled, easily torn, and capable of giving terrific hemorrhage.

In no modern procedure has there been a greater difference in the results of operative treatment. Why should some surgeons report a death rate of 10 per cent., others a mortality of less than 1 per cent.? This leads me to ask if surgery of the thyroid should not, for the present, be referred to those who have proved their ability to operate successfully. Should not the surgeon undertaking excision of the thyroid be familiar with details of the normal anatomy of the neck and upper thoracic cavity, with anomalies, which are of frequent occurrence, especially in the arterial and venous supply, and with the pathology of the thyroid lesions most frequently met? Would it not be worth while for the surgeon whose mortality rate has been over 1 per cent. in these operations, or especially those who are undertaking the operation for the first time, to take the trouble to visit Kocher's Clinic, or that of some other surgeon with a record for success in this operation, and carefully note the methods used? If all men had given themselves such preparation I believe many fatalities would have been avoided.

The experience of a number of surgeons, as shown by the statistics I have quoted, proves that the mortality can be reduced to 1 per cent. or less in simple goitre operations performed under local anesthesia. In view of these facts I quite agree with Kocher who states, that "It is not justifiable for physicians to introduce and follow medicinal treatment for a long time, when from the very beginning it is evident that it can be of no use. So soon as the goitre becomes dangerous, when there is much difficulty in breathing, or inflammatory changes; so soon as there is the slightest suspicion of malignant degeneration, operation is indicated. Suspicion of malignancy is always present when a person over thirty years of age shows enlargement of the thyroid without any definite cause. Unfortunately the majority of malignant goitres, which are not so uncommon even in relatively young persons, almost always come to the surgeon so late that radical operation is impossible. Goitres which are growing in the direction of the thoracic cavity are also dangerous, and should be operated upon. All goitres which reach a considerable size should be removed, and especially when even in a slight degree symptoms of Graves' disease are present, operation is the best means of prepreventing the further development of this serious disease."

It is not my purpose to discuss methods of operation in detail.

Such matters may be interesting to those who are devoting their attention to surgery, but they have little interest for the average practitioner. Personally, I always use local anesthesia and have found it entirely satisfactory. By its use time may be devoted to painstaking dissection, so necessary where many important anatomical structures are concerned, without the feeling that injury will result from prolonged anesthesia. The extreme discomfort caused by retching and vomiting after extensive dissection of the neck is avoided. Perhaps most important of all is the greatly reduced hemorrhage; everyone is familiar with the congestion of the face and neck which frequently accompanies the use of ether and can appreciate how much the overdistension of the veins in general anesthesia would add to our difficulties. I believe with Kocher, Witherspoon, and numerous others that the use of general anesthesia adds great danger in goitre operations. Witherspoon[7] states that all patients suffering from exophthalmic goitre are affected unfavorably by general anesthesia, whatever the nature of the operation, and whether the thyroid gland is handled or not. He mentions a case in which alarming symptoms followed the use of general anesthesia for curetment. The symptoms which he reports are similar to those generally considered the result of thyroid toxemia from squeezing the secretions of the gland into the circulation by handling during the operation.

The incision should be long. I prefer the transverse collar incision of Kocher, which with careful closure, leaves little scar, and that located so low that it is easily covered. In order to avoid scar I close the wound with the finest embroidery needle, using very fine horse hair as a suture material. Such careful closure requires much time, but if local anesthesia is used this is a matter of little consequence.

The applications of regional anatomy in this operation are numerous and important. All larger branches of the superficial cervical and supraclavicular nerves of the cervical plexus may be avoided by placing the transverse incision between their regions of distribution, thus making local anesthesia simple and satisfactory. In dissecting the flap upward to expose the thyroid, these nerves and their branches may be entirely avoided, for the nerves pass through the platysma near their origin. Both the nerve trunks and the skin they supply are lifted with the flap which includes the fascia beneath the platsma. I am not aware that this great aid to the success of local anesthesia has been previously referred to by any writer on this subject. The muscles attached to the larynx should be dissected carefully, divided near their upper attachment so as not to injure their nerve supply which enters the muscle near its middle, and after removal of the goitre, carefully sutured. This will prevent much deformity of the neck and disability in using the larynx. The dissection should be most careful. The superior thyroid artery should be secured first, then after freeing the goitre from its attachments, it can be dislocated from its bed and the inferior thyroid artery secured. All large veins should be isolated and tied, as far as possible, after the arteries are secured. If these precautions are followed the hemorrhage will be trifling. The capsule on the side toward the larynx should be separated with a small portion of the gland itself in order certainly to avoid injury to the recurrent laryngeal nerve. This should also be carefully avoided in tying the inferior thyroid artery. With the strictest aseptic precautions and careful observance of these details, I believe that the results obtained will be most satisfactory.

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[7] Trans. Amer. Med. Assoc., Section Surgery and Anatomy, 1903, 344.

The prognosis in thyroid tumors is more dependent upon prompt and proper treatment than in most diseases. In this connection we have to consider, first, the immediate operative mortality; and second, the prospect of permanent relief. As regards danger to life there has been great improvement in the results in recent years. In 70 operations for ordinary goitre before 1850, Kocher placed the mortality at 40 per cent. In 400 operations between 1850 and 1883, it fell to 15 per cent. while, since 1883, it has steadily fallen to less than 3 per cent. Kocher's own being 0.4 per cent. in simple cases. Dr. Finney, of Johns Hopkins Hospital, tells me that he has had no deaths from the operation, including his cases of exophthalmic goitre. Bloodgood reports no operative mortality and no recurrence following operations for cysts[8] in a large series of cases, and in 1 case of malignant tumor removed early[9] the patient has remained well six and a half years. The results of operative treatment vary greatly in the hands of different operators, but several surgeons have reported a mortality of 1 per cent or less.

Charles H. Mayo[10] says: "The public has learned that operations on goitre are not fatal as were supposed from the results obtained when operations were made as a last resort on patients suffering from this disease and in a moribund state. The fact is that the mortality attending the operation (excluding cancer and advanced cases of exophthalmic goitre) compares very favorably with other major surgery; and, in the hands of those experienced, with much of the so-called minor surgery." As regards the second question, the ultimate relief, there is every prospect of permanent cure except in malignancy or exophthalmic goitre. Wolff's statement that when one-half of the gland has been excised for hypertrophic goitre the remaining half always diminishes, is confirmed by Riverdin, Kocher, Mayo, my own experience, and that of others. In cases of exophthalmic goitre, not in extremis, the improvement following operative treatment has been very encouraging. At least 50 per cent. of the patients have been entirely relieved and in a large proportion of the remaining cases there has been great improvement. This is a far better showing than can be made for any or all of the other methods which have been given extended trial in the treatment of exophthalmic goitre. Let us compare the results in cases treated medically. Williamson[11] reports 24 cases treated medically with fatal termination in 6 (25 per cent.), improvement in 7, condition much the same in 3, and almost complete recovery in 7 only. Möbius[12] quotes statistics from five authorities and the estimate of mortality is from 10 per cent. by von Graefe to 25 per cent. by Charcot, in cases treated medically. Mayo quotes Ord and Mackenzie who tabulated 56 medical cases of exophthalmic goitre which had lasted five years or been fatal. There were 10 recoveries, 11 made incomplete recovery, in 13 there were considerable improvement, 4 were unchanged, and 14 (25 per cent.) were fatal. Others make more favorable reports. Osler says, "A certain proportion of the cases recover, but when the disease is well developed recovery is rare." These eminent internists give a much graver prognosis for cases treated medically than may be offered to patients treated surgically. No competent surgeon should have one-half as great mortality as they give. For my own experience, in 6 of the 16 cases who have recently consulted me I have advised trial of palliative measures. One of these patients, a girl just past puberty, is apparently improving; 4 remain about the same and there is certainly no urgent need of operation; in 1, after several months of treatment, as the growth had increased and the symptoms become more annoying, the patient decided to undergo the operation, the result from which has been entirely satisfactory. Thus I have referred back to the internist for treatment nearly one-third of my cases, yet in only 1 case has there been definite improvement. But what can be expected from medical measures in the case of an enchondroma so large as to cause great difficulty in breathing and swallowing, as in 1 of my cases; or in the case of a cystic goitre so large that the woman had been unable to swallow meat or other solid food for two years, as in another of my cases. The physicians who had charge of these women would have unhesitatingly advised removal of an ovarian cyst of half the size, causing far less distressing symptoms, or a breast tumor no less likely to be malignant. I am sure the question may be left to the judgment of anyone whether operation is not the only rational treatment for all benign and malignant tumors of the thyroid, as it is for tumors in other parts of the body.

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[8] Surgery, Gynecology, and Obstetrics, 1905, vol. i, p. 113.

[9] Ibid., 1906, vol. ii, p. 121.

[10] Jour. Amer. Med. Assoc., 1907, xlviii, 273.

In 10 of my operative cases, there was extreme discomfort, and in several, symptoms dangerous to life, yet operation had been previously advised in only 1, and in several cases the patient was advised against operation by prominent physicians. Can it be that the internists who had charge of these patients had attempted to follow the after-results of their treatment and realized the absolute failure of medical measures to give permanent relief? Is it not time that the results of excision of the thyroid in the hands of experienced men should be recognized? Is there any other operation of equal gravity which has been performed by any man with but one death in 661 cases, as in Kocher's latest report?

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[11] Brit. Med. Jour., November 7, 1896.

[12] Nothnagel's specielle Pathologie und Therapie, Band xxii, p. 65.

In closing, I would again emphasize the importance of early diagnosis, when in some cases there is still hope of relief by palliative measures. I would refer once more to the grave prognosis in all well-developed cases of exophthalmic goitre; to the difficulties of distinguishing benign from malignant tumors of the thyroid in the early stages of development; to the frequency of malignancy and the absolutely hopeless prognosis in malignant cases unless the growth is excised early, before a positive diagnosis can be made. I would again mention that reports of cases treated by medical measures alone show a death rate higher than those operated upon, and this in spite of the fact that usually only the most unfavorable cases have been submitted to excision; that operative measures have cured or relieved a proportionately larger number than any (I might almost say all) other treatments. In view of these facts it seems clear to me that all patients resisting the approved therapeutic measures should be urged to consult a competent surgeon.

TENDON TRANSPLANTATION IN THE TREATMENT OF CONGENITAL AND ACQUIRED TALIPES.

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The general surgeon has always been more or less dissatisfied with the treatment of deformities by means of apparatus, and, has, whenever practicable, preferred operative treatment, with its rapid results, to the slow and at times unappreciable progress which is attained by the use of braces. It is, however, chiefly owing to the teaching of Vulpius in Germany, and of Tubby and Jones in England, themselves orthopedists, that tendon transplantation has become a recognized form of treatment for paralysis. In this country it does not appear to have been very widely employed heretofore, and patients with infantile palsy have drifted about from one clinic to another, or, in rare instances, have grown from children to adults under the care of one individual. And though it cannot be denied that the treatment by apparatus is a great help, not only in increasing